

WHAT IS CLAIMED IS:

1 1. A set of surgical instruments for repairing a cartilage surface on a posterior
2 surface of the patella, comprising:

3 a first instrument including a channel defining a longitudinal axis that extends from
4 the channel to intersect an anterior surface of the patella; and

5 a second instrument that is mountable to the first instrument and that includes a
6 surface that is configured to be placed against a posterior surface of the patella, wherein the
7 longitudinal axis of the channel is at an angle to the surface of the second instrument when
8 the second instrument is mounted in the first instrument.

1 2. The set of surgical instruments of claim 1, wherein the angle is in a range of
2 approximately 80° to 100°.

1 3. The set of surgical instruments of claim 1, wherein the angle is approximately
2 90°.

1 4. The set of surgical instruments of claim 1, further comprising a guide wire
2 configured to be inserted into the channel in the first instrument and to drill a passage from
3 an anterior opening on the anterior surface of the patella to a posterior opening on the
4 posterior surface of the patella, wherein the longitudinal axis of the passage through the
5 patella is perpendicular to the posterior surface of the patella at the posterior opening.

1 5 The set of surgical instruments of claim 4 wherein the angle is in a range of
2 approximately 80° to 100°.

1 6 The set of surgical instruments of claim 4 wherein the angle is approximately
2 90°.

1 7 The set of surgical instruments of claim 4, further comprising a drill
2 configured to be passed over the guide wire and into the anterior opening, and operable to
3 enlarge the passage in the patella, from the anterior opening to the posterior opening.

1 8 The set of surgical instruments of claim 7 further comprising a delivery
2 instrument configured to deliver a cartilage graft into the passage in the patella, wherein the
3 delivery instrument includes an interior channel that extends between an open distal end and
4 an open proximal end, and a flange at the distal end, with the flange being configured to be
5 inserted into the anterior opening to deliver the cartilage graft through the interior channel
6 into the passage in the patella.

1 9 The set of surgical instruments of claim 8 wherein the delivery instrument
2 includes a window formed in a wall and open to the interior channel, whereby the cartilage
3 graft can be observed through the window during delivery through the interior channel.

1 10. The set of surgical instruments of claim 9, further comprising an insertion
2 instrument configured to be inserted into the interior channel of the delivery instrument to
3 advance the cartilage graft from the delivery instrument through the anterior opening in the
4 patella into the passage in the patella.

1 11. The set of surgical instruments of claim 1, wherein the first instrument
2 comprises a director handle including the channel and a slot configured to receive the second
3 instrument, and the second instrument comprises a guide that includes a foot configured to be
4 flush with a posterior surface of the patella when the foot is pressed against the patella.

1 12. The set of surgical instruments of claim 11, wherein the foot includes a lower
2 surface and a generally flat upper surface opposite the lower surface and configured to be
3 pressed against the posterior surface of the patella.

1 13. The set of surgical instruments of claim 12, wherein the generally flat upper
2 surface includes a central channel passing between an opening in the upper surface and an
3 opening in the lower surface.

1 14. The set of surgical instruments of claim 13, wherein the central channel has a
2 diameter that is reduced from the upper surface to the lower surface.

1 15. The set of surgical instruments of claim 13, wherein a longitudinal axis of the
2 central channel is perpendicular to the generally flat upper surface of the foot.

1 16. The set of surgical instruments of claim 11, further comprising a tube having
2 an interior channel and configured to be inserted in the channel of the director handle and to
3 receive a guide wire in the interior channel for drilling a hole in the patella.

1 17. The set of surgical instruments of claim 11, further comprising a drill having
2 an interior channel, wherein the interior channel is configured to be inserted over a guide
3 wire to enlarge a hole drilled by the guide wire in the patella.

1 18. The set of surgical instruments of claim 11, further comprising an offset tool
2 comprising:

3 a handle having a distal end;
4 a probe attached to the distal end and extending perpendicularly from a face of the
5 handle; and

6 a guide attached to the distal end, offset from the probe, and having an inner shaft
7 with a longitudinal axis that is substantially parallel to the probe.

1 19. The set of surgical instruments of claim 18, wherein the longitudinal axis of
2 the guide is offset from a longitudinal axis of the probe by approximately 0.1 to 0.3 inches.

1 20. The set of surgical instruments of claim 11, further comprising:
2 a chisel having a tip and a longitudinal shaft passing through the tip;
3 a chisel guard having a shaft and a flanged end, wherein the shaft is configured to
4 surround the chisel; and
5 a tamp configured to be inserted into the longitudinal shaft of the chisel.

1 21. The set of surgical instruments of claim 11, further comprising a tapered bone
2 plug compressor, wherein the compressor includes a longitudinal shaft passing between a
3 first opening and a second opening, and the diameter of the shaft increases from the second
4 opening to the first opening.

1 22. The set of surgical instruments of claim 11, wherein the distal foot is pivotably
2 attached to the guide.

1 23. The set of surgical instruments of claim 1, wherein the first instrument
2 comprises a guide tube including the channel and a window that allows visual inspection of
3 the channel; and
4 the second instrument comprises a clamp body that includes an upper arm and a lower
5 arm connected by an extension, wherein the upper arm includes a channel having a
6 longitudinal axis and in which the guide tube is disposed, and the lower arm includes a foot
7 having a channel aligned with the longitudinal axis of the channel of the guide tube and of
8 the channel of the upper arm.

1 24. The set of surgical instruments of claim 23, wherein the guide tube is
2 threadably received in the channel in the upper arm.

1 25. The set of surgical instruments of claim 23, wherein the upper arm is
2 connected to the extension at a right angle and the lower arm is connected to the extension at
3 a right angle.

1 26. The set of surgical instruments of claim 23, wherein the upper arm is
2 connected to the extension such that the upper arm and the lower arm are parallel.

1 27. The set of surgical instruments of claim 23, wherein the foot has a flat upper
2 surface configured to contact a bony surface.

1 28. The set of surgical instruments of claim 23, wherein the foot is mounted to the
2 lower arm in a fixed relationship.

1 29. The set of surgical instruments of claim 23, wherein the foot is mounted to the
2 lower arm in a pivotal relationship.

1 30. The set of surgical instruments of claim 23, wherein the foot has a flat upper
2 surface that is perpendicular to the longitudinal channel of the guide tube.

1 31. The set of surgical instruments of claim 23, further comprising a drill guide
2 configured to be inserted into the channel in the guide tube, wherein the drill guide includes a
3 longitudinal channel.

1 32. The set of surgical instruments of claim 31, further comprising a guide wire
2 configured to be inserted into the longitudinal channel of the drill guide.

1 33. A surgical method of repairing an articular cartilage surface on a posterior
2 surface of the patella, comprising:
3 placing a first instrument through a first incision so that the first instrument is
4 adjacent to an anterior surface of the patella;
5 placing a second instrument through a second incision so that the second instrument
6 is located between the posterior surface of the patella and the femoral head;
7 drilling a passage from the anterior surface of the patella to the posterior surface of
8 the patella, wherein the passage passes between an anterior surface opening and a posterior
9 surface opening;
10 inserting a graft into the anterior surface opening of the passage; and
11 inserting the graft further into the passage.

1 34. The surgical method of claim 33, wherein the first instrument includes a
2 channel having a longitudinal axis that extends from the channel to the anterior surface

3 opening of the patella, and through which a guide wire is inserted to drill the passage through
4 the patella.

1 35. The surgical method of claim 34, wherein the second instrument is mountable
2 to the first instrument and includes a surface that is configured to be placed against a
3 posterior surface of the patella, wherein the longitudinal axis of the channel of the first
4 instrument is approximately perpendicular to the surface of the second instrument when the
5 second instrument is mounted in the first instrument.

1 36. The surgical method of claim 33, wherein the passage through the patella is
2 approximately perpendicular to the posterior surface of the patella adjacent to the posterior
3 surface opening.

1 37. The surgical method of claim 34, further comprising enlarging the drilled
2 passage through the patella, wherein enlarging the passage comprises passing a drill over the
3 guide wire, inserting the drill into the anterior surface opening, and enlarging the passage
4 between the anterior surface opening and the posterior surface opening.

1 38. The surgical method of claim 33, wherein inserting the graft into the anterior
2 surface opening of the passage further comprises placing a delivery instrument against the
3 anterior surface opening, wherein the delivery instrument includes an interior channel that
4 extends between an open distal end and an open proximal end, and a flange at the distal end,
5 with the flange configured to be inserted into the anterior surface opening to deliver a
6 cartilage graft through the interior channel into the passage in the patella.

1 39. The surgical method of claim 38, wherein the delivery instrument includes a
2 window formed in a wall and open to the interior channel, whereby the cartilage graft can be
3 visually inspected during delivery through the interior channel.

1 40. The surgical method of claim 38, wherein inserting the graft further into the
2 passage comprises inserting an insertion instrument into the interior channel of the delivery

3 instrument and advancing the cartilage graft from the delivery instrument into the passage in
4 the patella through the anterior opening in the patella.

1 41. The surgical method of claim 33, wherein the first instrument comprises a
2 director handle and a tube, the second instrument comprises a patellar guide including a foot
3 having a generally flat surface, and the first and second instruments are assembled by
4 installing the patellar guide in a slot of the director handle and inserting the tube in a channel
5 of the director handle, wherein

6 placing the first instrument adjacent to the anterior surface of the patella comprises
7 placing a distal end of the tube against the anterior surface of the patella through a first
8 incision; and

9 placing the second instrument adjacent to the posterior surface of the patella
10 comprises inserting the second instrument in a second incision and placing the generally flat
11 surface of the foot against the posterior surface of the patella.

1 42. The surgical method of claim 41, further comprising inserting a guide wire
2 through a longitudinal channel of the tube, inserting the guide wire into the first incision, and
3 drilling a passage with the guide wire through the patella, wherein the passage passes
4 between the anterior surface and the posterior surface of the patella.

1 43. The surgical method of claim 42, wherein the passage through the patella is
2 perpendicular to the posterior surface of the patella.

1 44. The surgical method of claim 41, wherein the guide wire enters a channel in
2 the foot when the guide wire passes through the posterior surface of the patella.

1 45. The surgical method of claim 41, further comprising removing the director
2 handle and the patellar guide and inserting a drill over the guide wire to enlarge the passage
3 through the patella.

1 46. The surgical method of claim 41, further comprising drilling at least one
2 additional passage through the patella, wherein the additional passage is offset from the first
3 passage.

1 47. The surgical method of claim 46, wherein drilling the additional passage
2 comprises:

3 providing an offset tool comprising a handle having a distal end, a probe attached to
4 the distal end and extending perpendicularly from a face of the handle, and a guide attached
5 to the distal end, offset from the probe, and having an inner shaft with a longitudinal axis that
6 is substantially parallel to the probe;

7 placing the probe in the first passage;

8 placing the guide wire through the bullet and through the inner shaft of the guide; and

9 drilling the additional passage such that it is offset from the first passage by an offset
10 distance from the probe and the longitudinal axis of the inner shaft.

1 48. The surgical method of claim 41, further comprising harvesting a cartilage
2 replacement graft, wherein harvesting a cartilage graft comprises:

3 providing a chisel having a tip and a hollow longitudinal shaft passing through the
4 chisel;

5 providing a chisel guard having a hollow shaft and a flanged end, wherein the shaft is
6 configured to surround the chisel;

7 providing a tamp configured to be inserted into the longitudinal shaft of the chisel;

8 and

9 using the chisel to remove a cartilage graft from a surface of a bone, wherein the
10 cartilage graft includes a cartilage surface and a bony shaft.

1 49. The surgical method of claim 48, further comprising transplanting the
2 cartilage graft into the passage in the patella from the anterior surface of the patella to the
3 posterior surface of the patella.

1 50. A set of surgical instruments for repairing a tibial articulating cartilage
2 surface, comprising:
3 a first instrument including a channel having a longitudinal axis; and
4 a second instrument that is mountable to the first instrument and includes a surface
5 that is configured to be placed flush against the tibial plateau, wherein the longitudinal axis
6 of the channel intersects a surface of the tibial shaft and the tibia articulating surface and
7 forms a predetermined oblique angle with the tibial articulating surface when the surface of
8 the second instrument is flush against the tibial plateau.

1 51. The set of surgical instruments of claim 50, further comprising a guide wire
2 configured to be inserted into the channel and to drill an opening in the surface of the tibial
3 shaft along the longitudinal axis.

1 52. The set of surgical instruments of claim 51, wherein the guide wire is
2 configured to drill a tibial passage from the opening in the surface of the tibial shaft to an
3 opening in the tibial articulating surface.

1 53. The set of surgical instruments of claim 52, wherein the drilled tibial passage
2 has the predetermined oblique angle with the tibial articulating surface.

1 54. The set of surgical instruments of claim 50, wherein the second instrument
2 comprises an arm and the arm includes the surface, and the surface is configured to be placed
3 against the tibial plateau by passing the surface and a portion of the arm below a meniscus
4 and above the tibia.

1 55. The set of surgical instruments of claim 50, wherein the second instrument
2 comprises an arm and the arm includes the surface, and the surface is configured to be placed
3 against the tibial plateau by passing the surface and a portion of the arm above a meniscus
4 and below the femur.

1 56. The set of surgical instruments of claim 52, further comprising a delivery
2 instrument configured to deliver a cartilage graft into the drilled tibial passage, wherein the
3 delivery instrument includes an interior channel that extends between an open distal end and
4 an open proximal end, and a flange at the distal end, with the flange configured to be inserted
5 into the anterior opening to deliver a cartilage graft through the interior channel into the tibial
6 passage.

1 57. The set of surgical instruments of claim 56, wherein the delivery instrument
2 includes a window formed in a wall and open to the interior channel, whereby the cartilage
3 graft can be visually inspected during delivery through the interior channel.

1 58. The set of surgical instruments of claim 57, further comprising an insertion
2 instrument configured to be inserted into the interior channel of the delivery instrument to
3 advance the cartilage graft from the delivery instrument into the anterior opening in the tibia.

1 59. The set of surgical instruments of claim 50, wherein the first instrument
2 comprises a director handle including the channel and a slot into which the second instrument
3 is installed; and

4 the second instrument comprises a guide that includes an arm and a distal foot and the
5 arm is configured to be adjacent to a femoral condyle and the foot is configured to be flush
6 with a tibial plateau when the foot is pressed against the tibial plateau.

1 60. The set of surgical instruments of claim 59, wherein the foot includes a
2 surface including a pin projecting from the surface and configured to be pressed into the
3 tibial plateau when the foot is pressed against the tibial plateau.

1 61. The set of surgical instruments of claim 63, further comprising a tube
2 configured to be inserted in the channel and to receive a guide wire for drilling a passage
3 through the tibia to the tibial articulating surface, wherein the passage forms an oblique angle
4 with the tibial articulating surface.

1 62. The set of instruments of claim 61, wherein the oblique angle is
2 approximately 30°.

1 63. The set of surgical instruments of claim 59, further comprising a drill having a
2 central shaft, wherein the shaft is configured to be inserted over a guide wire to enlarge a
3 hole drilled by the guide wire.

1 64. The set of surgical instruments of claim 59, further comprising an offset tool
2 comprising:

3 a handle having a distal end;

4 a probe attached to the distal end and extending perpendicularly from a face of the
5 handle; and

6 a guide attached to the distal end, offset from the probe, and having an inner shaft
7 with a longitudinal axis that is substantially parallel to the probe.

1 65. The set of surgical instruments of claim 64, wherein the longitudinal axis of
2 the guide is offset from a longitudinal axis of the probe by approximately 0.1 to 0.3 inches.

1 66. The set of surgical instruments of claim 59, further comprising:

2 a chisel having an angled tip and a longitudinal shaft passing through the chisel and
3 the tip, wherein a longitudinal axis of the longitudinal shaft forms an oblique angle with a
4 cross-sectional surface of the tip;

5 a chisel guard having a shaft and a flanged end, wherein the shaft is configured to
6 surround the chisel; and

7 a tamp configured to be inserted into the longitudinal shaft of the chisel.

1 67. The set of surgical instruments of claim 66, wherein the oblique angle is
2 approximately 30°.

1 68. The set of surgical instruments of claim 59, further comprising a tapered bone
2 plug compressor, wherein the compressor includes a longitudinal shaft passing between a

3 first opening and a second opening, and the diameter of the shaft increases from the second
4 opening to the first opening.

1 69. A surgical method of repairing a tibial articular cartilage surface, comprising:
2 placing a first instrument through a first incision so that the first instrument engages a
3 surface of the tibial shaft;
4 placing a second instrument through a second incision so that the second instrument
5 is located on the tibial plateau;
6 drilling a passage from the surface of the tibial shaft to the tibial articular cartilage
7 surface, wherein the passage passes between a tibial shaft surface opening and a tibial
8 articular cartilage surface opening;
9 inserting a graft into the tibial shaft surface opening of the passage; and
10 inserting the graft further into the passage.

1 70. The surgical method of claim 69, wherein the first instrument includes a
2 channel having a longitudinal axis that is configured to intersect the surface of the tibial shaft
3 and the tibial articulating surface; and
4 the second instrument is mounted to the first instrument and includes a surface that is
5 configured to be placed flush against the tibial plateau, wherein the longitudinal axis of the
6 channel forms a predetermined oblique angle with the tibial articulating surface when the
7 surface of the second instrument is flush against the tibial plateau.

1 71. The surgical method of claim 70, wherein drilling the passage from the
2 surface of the tibial shaft to the tibial articular cartilage surface further comprises inserting a
3 guide wire into the channel in the first instrument and drilling an opening in the surface of
4 the tibial shaft along the longitudinal axis.

1 72. The surgical method of claim 71, further comprising drilling the passage from
2 the opening in the anterior surface of the tibia to an opening in the tibial articulating surface.

1 73. The surgical method of claim 72, wherein the drilled passage is at the
2 predetermined oblique angle with the tibial articulating surface.

1 74. The surgical method of claim 69, wherein the second instrument comprises an
2 arm and the arm includes the surface, and the surface is placed against the tibial plateau by
3 passing the surface and a portion of the arm below a meniscus and above the tibia.

1 75. The surgical method of claim 69, wherein the second instrument comprises an
2 arm and the arm includes the surface, and the surface is placed against the tibial plateau by
3 passing the surface and a portion of the arm above a meniscus and below the femur.

1 76. The surgical method of claim 69, wherein inserting the graft into the tibial
2 shaft surface opening of the passage further comprises placing a delivery instrument into the
3 tibial shaft surface opening,

4 wherein the delivery instrument includes an interior channel that extends between an
5 open distal end and an open proximal end, and a flange at the distal end, with the flange
6 configured to be inserted into the tibial shaft surface opening to deliver a cartilage graft
7 through the interior channel.

1 77. The surgical method of claim 76, wherein the delivery instrument further
2 includes a window formed in a wall and open to the interior channel, whereby the cartilage
3 graft can be visually inspected during delivery through the interior channel.

1 78. The surgical method of claim 77, wherein inserting the graft further into the
2 passage comprises inserting an insertion instrument into the interior channel of the delivery
3 instrument to advance the cartilage graft from the delivery instrument into the tibial shaft
4 surface opening in the tibia.